

## **Final Project – Design and Reflection Document**

### **Problem:**

Final Project of this class is a text-based game that uses a Space class in a linked structure. Player must move around the Spaces to interact with the Space and collect items. At least one item must be received to unlock the end of the game. The game must also have a theme.

### **Requirements:**

- a) Space class that has at least 4 Space pointers.
- b) At least 6 Spaces
- c) At least 3 derived classes from Space, each with a special action for player to complete.
- d) Gameplay should have a theme.
- e) Keep track of where the player is (map).
- f) Container for the player to carry objects.
- g) Step limit/time limit
- h) Goal declared at beginning of the game.
- i) No free-form input.
- j) Menu option for each scenario.

### **Program Design:**

***See attached flowchart.***

This project involves past concepts such as linked structures, STL containers, inheritance and polymorphism, as well as use of pointers.

I reused code and designs from the previous assignments on the above topics, and tweaked them to suit the overall project design.

### **Test Plan:**

***See attached PDF.***

### **Reflection:**

This project reminds me of Langton's Ant where I thought I knew how I want to design/implement it, but later run into more and more issues that compounded over time.

I was unable to complete the project within the time allotted due to job commitments and other issues. This is disappointing but alas a part of life!

I scripted out the story I wanted to tell and organized it by Space class and scenarios. I ran into issues figuring out how best to link everything together, with the copious amounts of pointers and menus and functions.

Since the program isn't really in working order, I am including what I have envisioned below as well as the script and related documents.

How the program *should* work:

1. Player executes the program, which summarizes the goal and asks player if they'd like to Start or Exit.
2. Player starts game in the Main Hall of the house. Player is expected to pick up all the items in the toolbox to store in their inventory. Shutting the double doors would regain 1 degree heat. Lighting up the fireplace also helps keep player's body temperature up.
3. Player is free to explore in East, West, North, or Up direction. Recommend to start in East or West.
4. East leads to the Kitchen, where player can choose to interact with the whiskey bottle and pet the kitten to obtain secret Key Items.
5. West leads to the Gym, where player can rearrange hand weights and squat to receive secret Key Items. Player can run on the treadmill to keep body temp up.
6. North leads to the Pond, this is where player must have the items from the Toolbox earlier. Player can try fishing and repair the sign to obtain secret Key Items.
7. Up leads to the Study, where player is encouraged to explore the Desk, Bookcases, and Piano. The Desk provides a flashlight, which is needed to access the secret Attic. The Bookcases contain a Hardcover, which provides a secret Key Item; a Diary, which also has a Key Item; and Sheet music, which can be played at the piano for additional items.
8. Once player has gathered all the secret Key Items and has a flashlight, they can venture upstairs to the Attic. They will perform one simple task of compiling their secret Key Items (which is a cout syntax) that will project the final message of the story.

Issues:

Here are several issues that I was stuck at while debugging:

1. Compiler issues – I was having a lot of undefined reference errors during compile, and for some reason they went away during a lucky attempt. I was able to finally fix this after defining my virtual (but non-pure) functions in the Space base class. It's still a mystery to me why the program compiled once.
2. Menu issues – I struggled to figure out the best way to organize all the menus and loops back to the correct rooms. Our previous assignments mostly focused on a linear type of traversal through nodes, but my program requires a star type of architecture. For some reason, I am finding it really difficult to loop back to the original Main Hall in the center.
3. Scope creep – I think I underestimated how much work my idea truly is! When I was on the drawing board everything seemed quite straight forward to me. However once I ran into the above technical issues, I discover logical errors that eventually compounded. I

also spent more time than I should've designing the story flow and theme. With the limited time I had this past month I could've benefited from better time management.

Even though I am not able to complete the project and finish debugging, I am proud of my project idea and learned a lot just from seeing all these new errors. I will continue to work on this until I complete the game (after I take a much-needed breather).

By the way, I found a great ASCII drag-and-drop artwork site that helped create some of the ASCII maps in my game. ASCIIFlow Infinity ([asciiflow.com](http://asciiflow.com)). Definitely bookmarking this for future use.

Please continue reading for script and other supplementary material.

Script

Spectrum

20 years.

It was 20 years ago when you celebrated with friends over your first corporate job.

20 years ago when you dangled the "New Homeowner" keychain in front of your newborn child, whose little fists fought to grab the shiny piece.

Your trusty computer, Mary, did not make the 20-year mark. She was abandoned in a corner of the basement, her power cord tangled with the old TV antenna and fax machine.

Kids are ever so curious.

There is the good type of curious, where their heads are full of "Why?"s and their hands full of mud and bugs.

There is the other type, the adventurer, who wanders far and deep in search of treasures.

The firemen later told you that the treasure had a faulty wire. The cops mentioned a baby gate recall. The EMTs shook their heads and packed up their supplies.

(Enter to Continue)

\*\*\*

The pills barely sustain you. Your hands shook violently.

You gulped down the last of the whiskey. Your tongue numb to its taste.

You sat on the bathroom floor sobbing, polished shoes from the next stall quickly stomped away.

You stumbled over to the sink and washed your face. You headed back to Room 3A for your 2pm sales call.

(Enter to Continue)

\*\*\*

"It's not you, it's the metrics", said your manager, who is 8 years younger, hands you a neatly stapled packet.

"Oh before you go, here is your 20-year service award". She hands you a plastic pen, the type you can find in the dollar bin on a good day.

(Enter to Continue)

\*\*\*

You sold the house and booked a one-way trip to the faraway mountains.

You set up a base camp, and worked out a plan with Gusang, a local mountaineer.

A snow storm hits. You cannot breathe.

You see your guide tumbled out of sight.

You decide to trek east.

An hour later, you come upon a seemingly abandoned house.

Knock, knock. No answer.

You finally know the meaning of "Chill to the bone".

You are tired, and hungry.

You decide to enter the house.

(Enter to Continue)

\*\*\*

Main Hall

The Main Hall is lighted by two windows and has a high ceiling. Occasionally the roar of the wind adds to the mysteriousness of the space. The entryway looks well-trodden.

You take a step forward and almost tripped over a low cabinet. Several pairs of house slippers strewn out, along with a few baby rats that sought shelter from the cold. You say a silent thank you to your unknown host, and hope that you are not intruding. You decide to look around the room.

You notice that there are three hallways to the East, North, and West. Each hallway leads to a shut door. You wonder what lies beyond.

A wooden staircase leads upward, possibly to a second floor.

A small [Toolbox] sits by the main double door. A [Fireplace] invites you to light it up.

Rest easy, traveler.

You can:

- 1) Shut the main double door
- 2) Go down the East hallway
- 3) Go down the North hallway
- 4) Go down the West hallway
- 5) Go up the Stairs
- 6) Examine the Toolbox
- 7) Examine the Fireplace
- 8) Exit the Main Hall (This goes back to main menu)

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Toolbox

A small toolbox lies opened by the door. In it are a [Hammer], a [Duct Tape], and an [Axe].

You can:

- 1) Close the toolbox
- 2) Pick up the [Hammer]
- 3) Pick up the [Duct Tape]
- 4) Pick up the [Axe]
- 5) Leave the Toolbox alone (goes back to Main Hall).

\*\*\*

## Fireplace

A few dried logs piled next to the fireplace. You have a lighter in your pack.

You can:

- 1) Light the Fireplace (+1 to body temp)
- 2) Leave it alone

\*\*\*

## East Hallway

e

The East hallway leads you to an unlocked door. You open it to discover a well-stocked kitchen.

Your first thought is to look for booze.

A sudden but gentle "meow~" made you alert. A stray kitten poked its head from the pantry.

You open the pantry and find a few jars of pickles.

You offered the pickles to the kitten, but it looks uninterested.

You are thirsty. You looked at the pickled juice for a moment and decides to explore other options.

You try to turn on the faucet at the sink. It is broken.

You can:

- 1) Examine the sink
- 2) Pet the kitten
- 3) Return to the Main Hall

\*\*\*

Examine the sink

The sink is lined with cracks. You open the cabinet underneath and find rusted pipes.

Half a bottle of whiskey is hidden in a corner. Beneath it is a crumpled piece of paper.

You receive Key Item [cout]!

You Can:

- 1) Take the Whiskey
- 2) Examine Something Else



\*\*\*

## Whiskey

You quickly take a swig of the amber liquid.

You feel a little warmer!

\*\*\*

## Pet the Kitten

The baby cat meows and rubs its head on your legs.

It is love at first sight!

You decide to name it Maggie. You playfully tickled its belly.

Maggie meows and heads to the pantry. After awhile, it returns to you with a gift.

You receive Key Item [d]!

\*\*\*

## West Hallway

The West Hallway takes you to a spacious home gym. You welcome the natural light coming in from the window, and marveled at the old ceiling fan that seems to still be in working order.

There is a [Treadmill], a rack of [Hand Weights] in need of cleanup, and a [Mirror]

You can:

- 1) Run on the [Treadmill] (+1 to body temp)
- 2) Rearrange [Hand Weights]
- 3) Squat in front of the [Mirror]
- 4) Return to the Main Hall

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### Treadmill

The elevation makes it difficult to breathe, but you began a slow jog on the [Treadmill].

+1 to body temp!

You can:

- 1) Jog again
- 2) Examine Something Else
- 3) Return to the Main Hall

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### Hand Weights

You haven't weight trained in years. The 50 lb dumbbell seems daunting. You carefully rearranged the weights from lightest to heaviest.

You receive Key Item [b]!

\*\*\*

## Mirror

Your ex-wife, Mary, was a gym rat. She would've loved to take a photo in front of this large mirror.

She is probably working out at some rich man's mansion.

You are not bitter.

You wonder if you can still do a perfect squat.

You can:

- 1) Perform squats
- 2) Examine something else
- 3) Return to the Main Hall

\*\*\*

## Squats

You drop your rear end as if sitting in a chair.

You make sure your knees are at 90 degrees.

Huff...

Puff...

Huff...

Puff...

Huff...

Puff...

Huff...

Puff...

Huff...

Puff...

+1 body temp

You received Key Item [makefile]!

You can:

- 1) Do more squats
- 2) Examine Something Else
- 3) Return to the Main Hall

\*\*\*

North Hallway

The North hallway leads to an unlocked glass door. Beyond it is a frozen pond surrounded by dirt that was once a fairly manicured lawn. A few broken lounge chairs lined the pond. A small swing set sits in a corner, covered with thick layers of snow.

By the pond is a [Fishing Rod] and a small ice chest. A broken [Do Not Feed Sign] and a [Twig] lie on the ground.

Your body temp drops by 2!

You Can:

- 1) Examine the [Fishing Rod]

- 2) Examine the [Twig]
- 3) Try Fishing
- 4) Repair the [Do Not Feed Sign]
- 5) Return to the Main Hall

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### Fishing Rod

The fishing rod is shoddily made, and looks more like a child's toy than a functional tool.

Perhaps you can try fishing.

\*\*\*

### Twig

The twig is covered by bite marks. No clue whether it is from a child or from a pet.

You receive Key Item[Twig]!

\*\*\*

### Fishing

You picked up the fishing rod and examined the frozen pond.

```
if(axe == false || rod == false)
```

You will need something to break the ice.

if (axe == true && rod == true)

You lift the axe high above you and slashed at the ice, Samurai style.

The ice cracks.

You threw the fishing rod in and waited..

bodytemp - 2

and waited...

bodytemp -2

and waited...

bodytemp -2

The line caught something!

You reeled it up and scoffed that it is only a crumpled piece of paper.

You receive Key Item [a]!

You can:

- 1) Continue Fishing
- 2) Examine Something Else
- 3) Return to the Main Hall

\*\*\*

## Fix the Sign

The [Do Not Feed Sign] was blown over by the strong winds. Somehow you feel compelled to repair it.

```
if(hammer == false || tape == false || twig == false)
```

You may need something else to finish this task.

```
else
```

You remember that you have tape in your pack. Now you just need something to make the sign stand upright.

You think you can make something with the tools and the twig you found on the ground.

You pulled out a piece of [Duct Tape]...

You stuck one end of the tape on the sign, and the other on the twig...

You repeat the above steps 5 more times.

You [Hammer]ed the sign to the dirt.

body temp -2!

You receive Key Item [<iostream>]!

You Can:

- 1) Examine Something Else
- 2) Return to the Main Hall

\*\*\*

Up the Stairs

The wooden steps creak as you put your weight on them. The paint on the railing chips away as soon as you lay your hands on it.

At the top of the stairs is another room. The door is wide open.

You step into what looks like a Study. A dusty [Desk] sits to your left. Massive cherry-wood [Bookcases] line the wall to your right. A grand [Piano] is installed in the back of the room, standing majestic on a plush royal red rug.

There are surprisingly no windows at all. No wonder the door is kept open.

At the center of the ceiling, where a skylight would've made sense, is a wooden panel with a metal ring luring you to pull it. You moved a chair underneath and tugged at the ring until the panel loosens. A ladder gently lowers until its base reaches the floor. A few more baby rats scurried down the ladder. One might've hit your head before tumbling down the steps.

You Can:

- 1) Examine the [Desk]
- 2) Examine the [Bookcases]
- 3) Examine the [Piano]
- 4) Examine the [Ladder]
- 5) Return to the Main Hall

\*\*\*

### Bookcases

The bookcases are almost as tall as the ceiling. Books of various colors, sizes, and thickness are packed by the authors' names.



A large [Hardcover] on a top shelf catches your attention, so do a few sheets that peek out from an otherwise neatly organized lower shelf. A [Diary] is tucked into a crevice in between the bookcases.

You Can:

- 1) Examine the [Hardcover]
- 2) Examine the [Sheets]
- 3) Examine the [Diary]

\*\*\*

Hardcover

You propped yourself up with a chair and picked out the large [Hardcover]. "A Brief History of Time" by Stephen Hawking.

You receive Key Item [c]!

You receive Key Item [Password]!

You Can:

- 1) Examine Something Else
- 2) Return to the Main Hall

\*\*\*

Sheets

You carefully pulled out the loose sheets to discover that they are handwritten music pieces.

It's been awhile since you've played an instrument, but perhaps it's worth a try? After all, you are trapped in the snow with nowhere else to go.

You Can:

- 1) Examine the [Piano]
- 2) Examine Something Else
- 3) Return to the Main Hall

\*\*\*

Piano

The grand piano needs a bit of polish, but otherwise looks brand new. It doesn't seem like anyone has played it recently.

if( sheet == false)

You need something else to complete this task.

else

It is a rough start. The symbols are just mumble jumble in your brain, and your eyes start to blur. You shake your head to refocus your attention.

After awhile, muscle memory take over and you are playing a happy little tune. You smile at the dexterity of your fingers.

You receive Key Item [<<]!

You Can:

- 1) Examine Something Else
- 2) Return to the Main Hall

\*\*\*

## Diary

An old diary is hastily stuffed in between two bookcases. There are illegible scribbles on the first few pages.

You curiously turned the book over, and discover a symbol you've learned to both love and hate.

You receive Key Item [;]!

You Can:

- 1) Examine Something Else
- 2) Return to the Main Hall

\*\*\*

## Desk

A normal work desk with a small pile of books on one end, and a few photo frames on the other.

A flash light lies on the surface. You turned it on. Seems like the battery is still charged. You turned it off to conserve the battery.

You receive Key Item [Flashlight]!

You Can:

- 1) Examine Something Else
- 2) Return to the Main Hall

\*\*\*

Ladder

if(light == false)

The ladder leads up to an attic space. A faint artificial glow emanates from a machine humming somewhere. It is too dark to see. You need something to guide your way.

else

You turned on the flash light to better see what is in the attic. An old [Computer] spews audio nonsense into the dusty, musky air. The dome-shaped ceiling calls out to you.

You Can:

- 1) Examine the Computer
- 2) Return to the Study

\*\*\*

Computer

An old desktop and CRT monitor combo. This is a treasure from the old days. Perhaps this belongs in a museum.

The power cord is plugged in, and a steady hum emits from the tower. A blinking prompt on the screen prompts for a password.

```
if(password == false)
```

You need the password to continue

```
else
```

You remember the password you copied from the book downstairs. You punched it in and hit Enter.

A file directory appears before you, and it contains only 1 file called "main.cpp"

As a programmer of 20 years, you have an itch to open up the files and explore.

You pulled up a chair and typed... "vim main.cpp".

You see:

```
//Print the message
```

There is a snippet of code here:  $a + b + c + d$

"Print the message?" You thought. That's quite easy, as long as I remember the syntax...

```
if(!inventory) //inventory = true when all items received
```

You need something else to complete this task

```
else
```

You barely remember your C++, but thanks to man pages, you are able to piece together a line to print the message:

```
#include <iostream>
```

"That's the first step", you mumble to yourself.

```
cout << a+b+c+d;
```

"and here we go...". You press Enter.

(Enter to Continue)

The projector grumbles and starts up on its own, shooting up a beam of light into the dome.

You follow the light to see the message displayed:

"The past, like the future, is indefinite and exists only as a spectrum of possibilities"

~ Stephen King

You sigh, remembering everything that has happened up to this point. You used to wish that there are parallel universes for you to escape to. Somewhere with less pain and suffering. A time that speaks without finality.

When you first began your journey, you believed that you were looking for your Resting Place.

This house, hidden somewhere within the storm, is a perfect place for a long sleep.

Yet, lying supine staring at the projection, you feel a surge of curiosity about life, about what may lie ahead.

"Meow~" the kitten gently licks your face. You feel content here, where the past, present, and future collide.

You drift off to the sweetest dreams you've had in years.

The End

#### Asset IDs

ID	Description
201	Map
202	Lighter
203	Photo
204	Wrench
205	Hammer
206	Duct Tape
207	Axe
208	Fishing Rod
209	Twig
210	Sheet Music
211	Bucket
212	Flashlight

#### Key Items

ID	Key Items
101	a
102	b
103	c
104	d
105	cout
106	<<
107	makefile
108	;
109	<iostream>
110	Password